FIG. 1

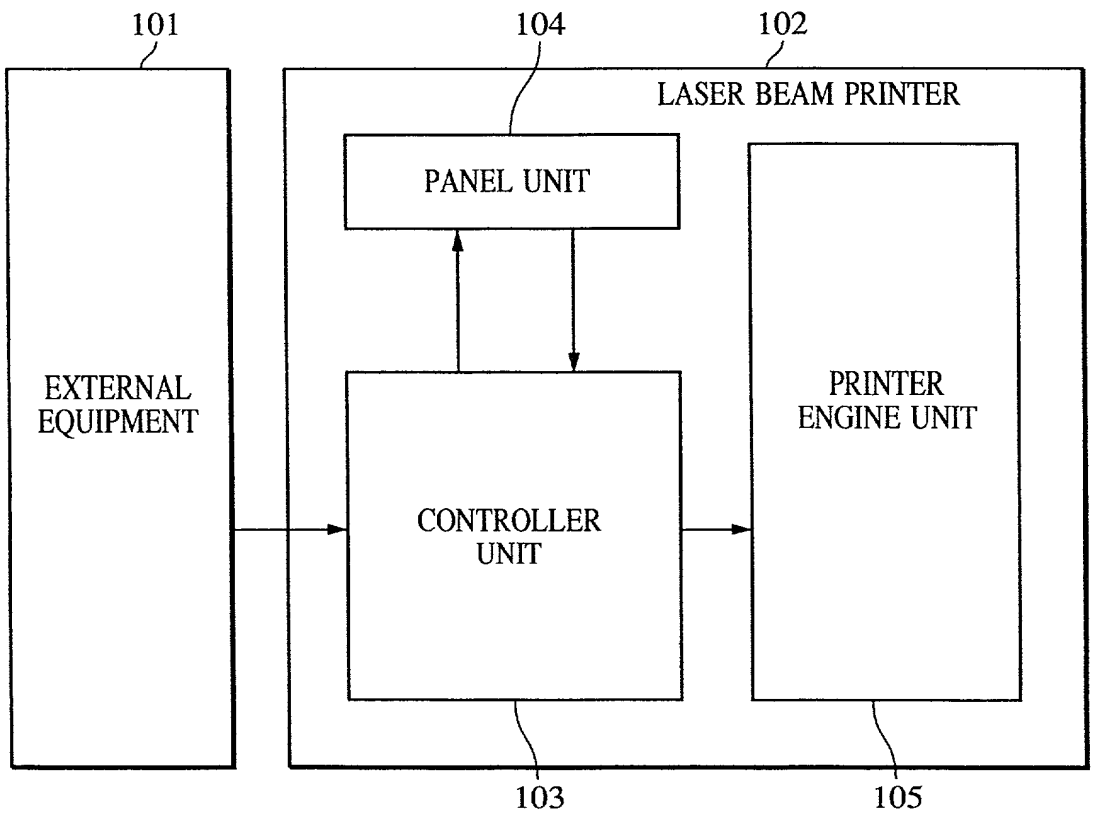

101
104
102
LASER BEAM PRINTER
PANEL UNIT
EXTERNAL EQUIPMENT
CONTROLLER UNIT
PRINTER ENGINE UNIT
103
105

FIG. 2

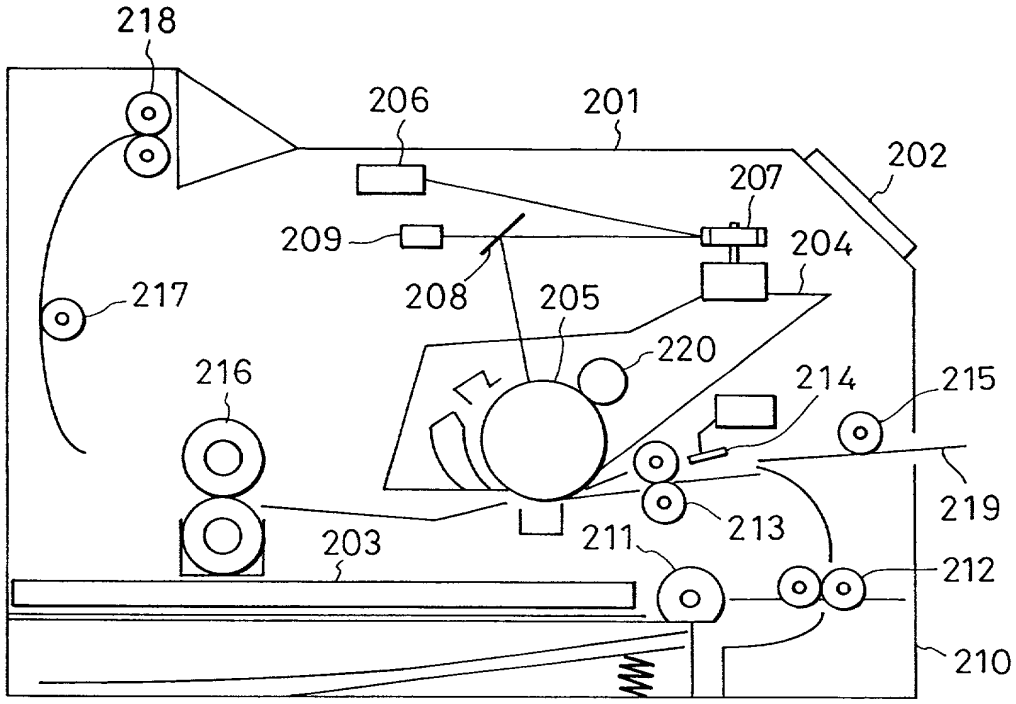

218
206
201
202
207
209
204
217
208
205
220
216
214
215
219
213
203
211
212
210

FIG. 3

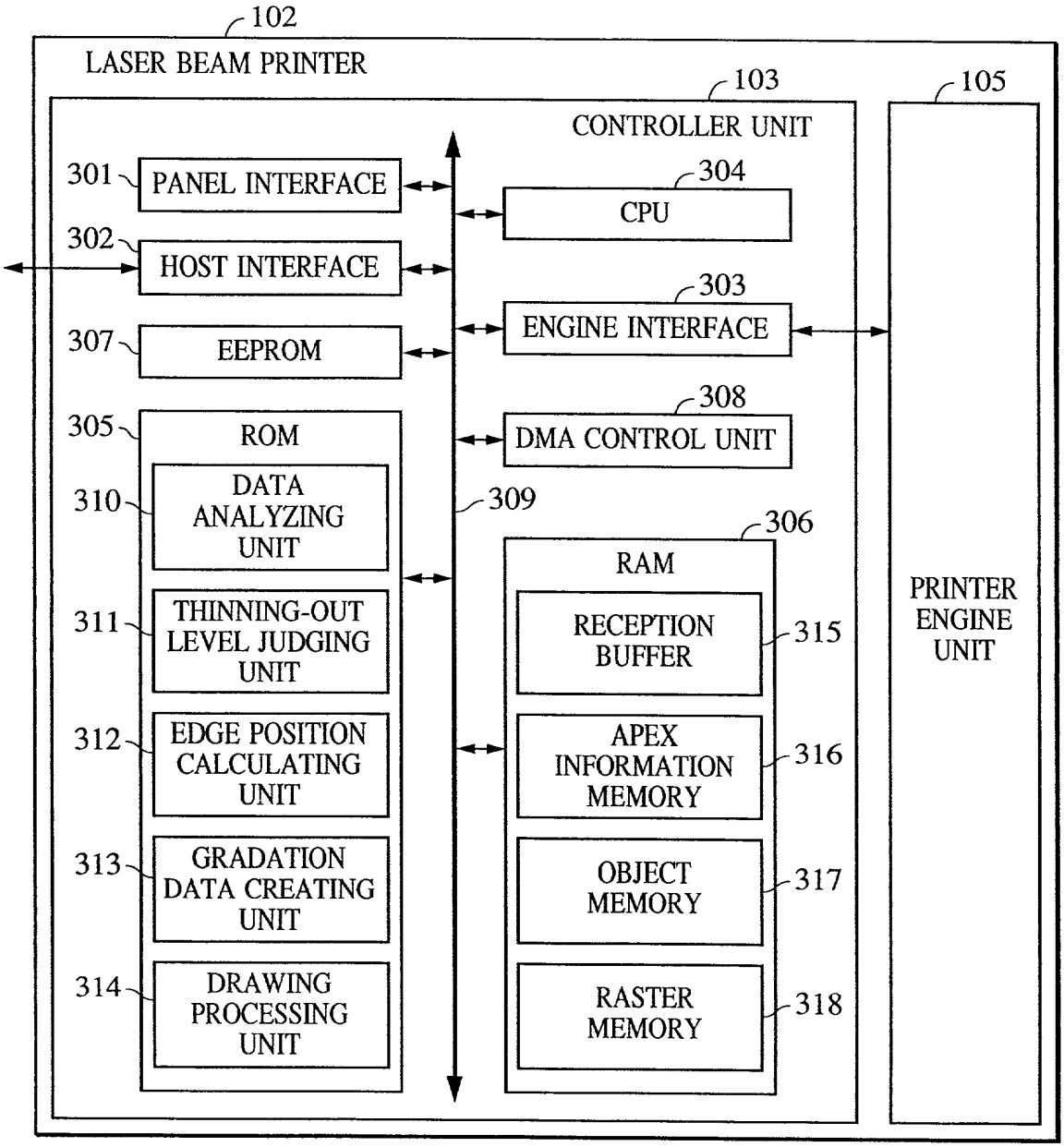

102
LASER BEAM PRINTER
103
CONTROLLER UNIT
105
301
PANEL INTERFACE
304
CPU
302
HOST INTERFACE
303
ENGINE INTERFACE
307
EEPROM
308
DMA CONTROL UNIT
305
ROM
310
DATA ANALYZING UNIT
309
306
RAM
311
THINNING-OUT LEVEL JUDGING UNIT
RECEPTION BUFFER
315
312
EDGE POSITION CALCULATING UNIT
APEX INFORMATION MEMORY
316
313
GRADATION DATA CREATING UNIT
OBJECT MEMORY
317
314
DRAWING PROCESSING UNIT
RASTER MEMORY
318
PRINTER ENGINE UNIT

FIG. 4

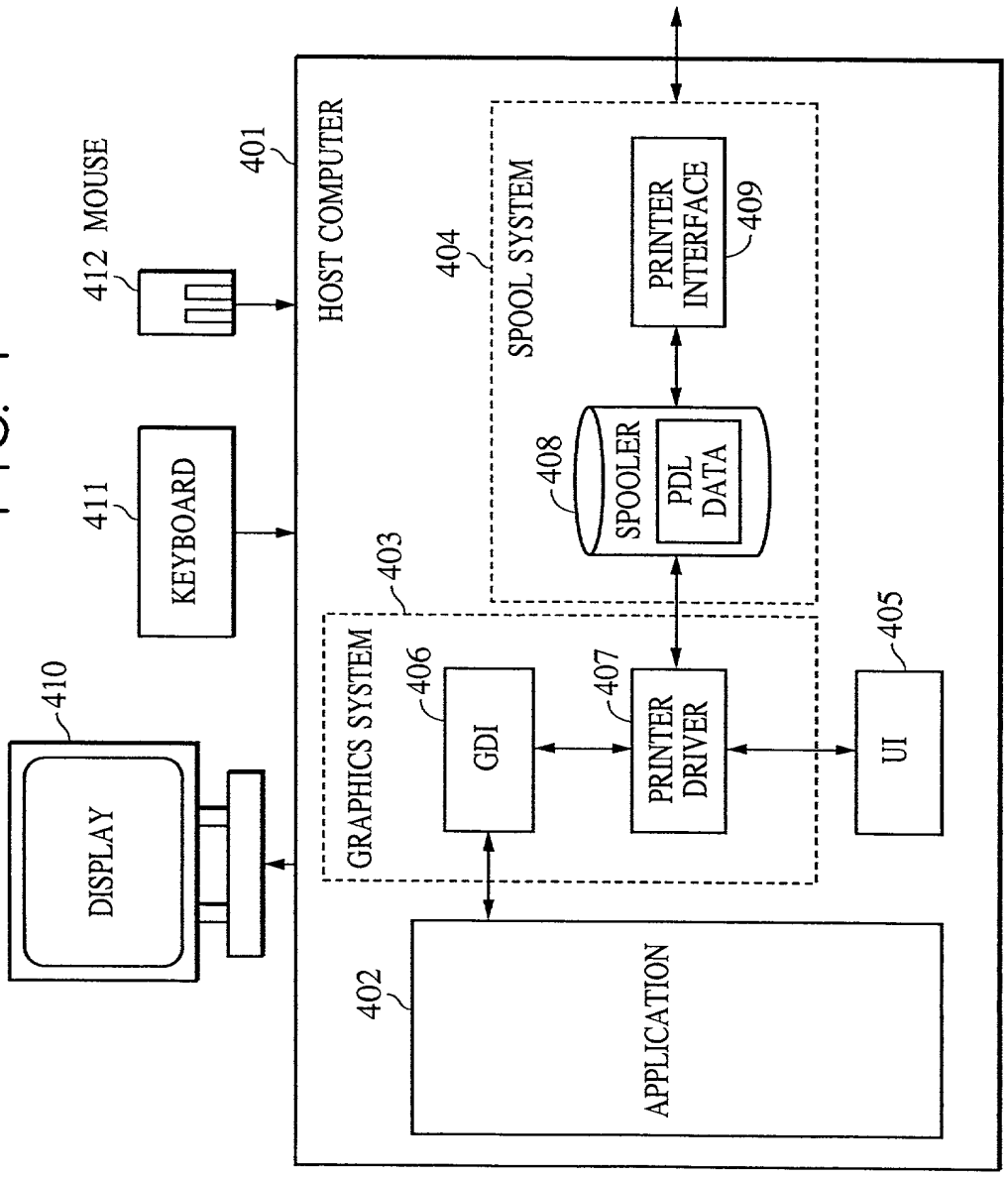
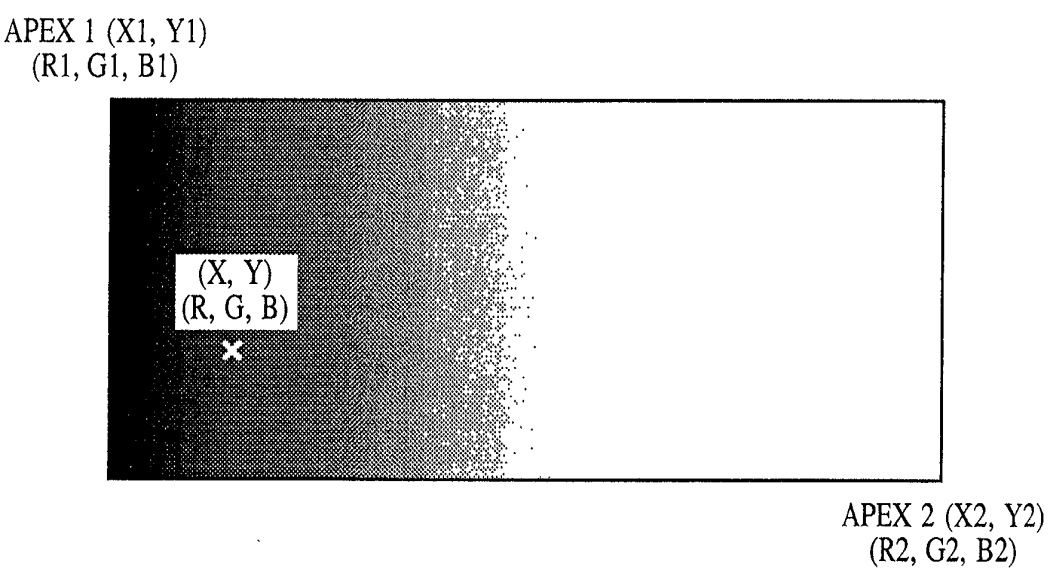

HOST COMPUTER
401
MOUSE
412
KEYBOARD
411
DISPLAY
410
APPLICATION
402
GRAPHICS SYSTEM
403
GDI
406
PRINTER DRIVER
407
UI
405
SPOOL SYSTEM
404
SPOOLER
408
PDL DATA
PRINTER INTERFACE
409

FIG. 5


HORIZONTAL GRADATION DRAWING
APEX 1 (X1, Y1)
(R1, G1, B1)
(X, Y)
(R, G, B)
APEX 2 (X2, Y2)
(R2, G2, B2)

TOKEN BRIDGE

FIG. 6

VERTICAL GRADATION DRAWING

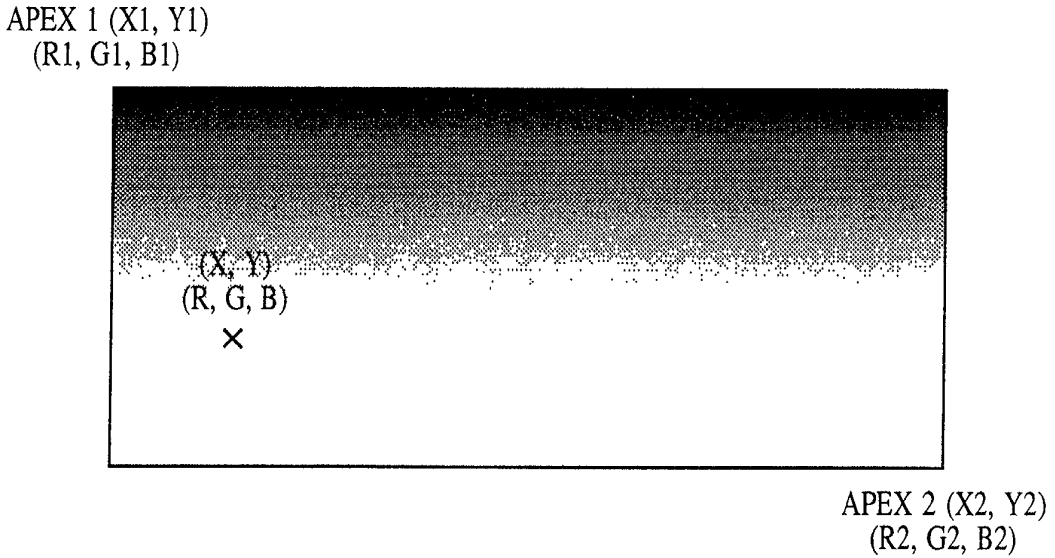


FIG. 7

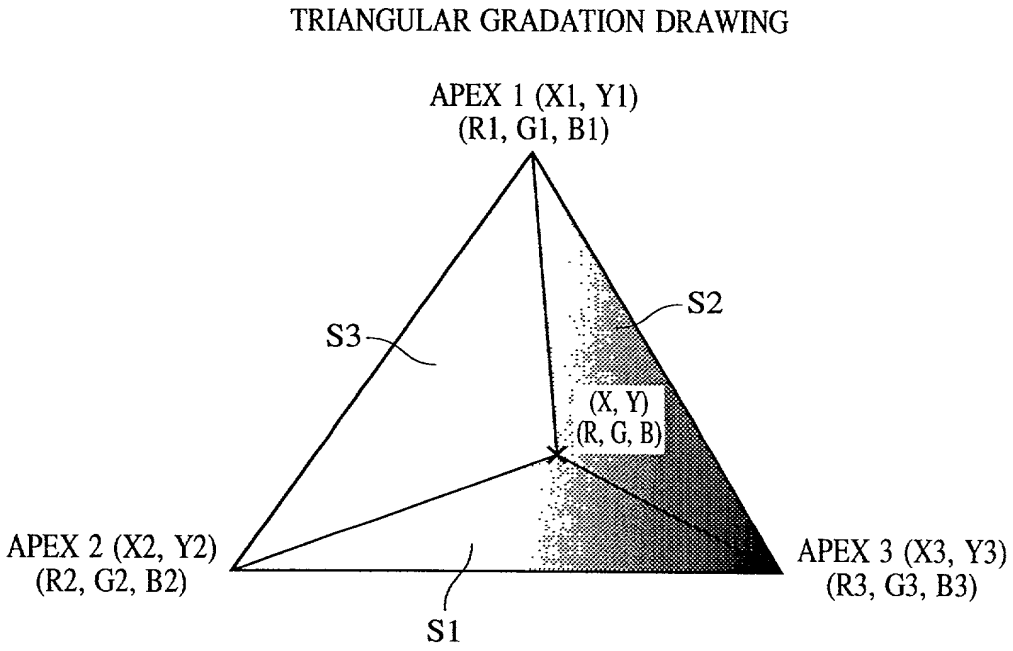

TRIANGULAR GRADATION DRAWING
APEX 1 (X1, Y1)
(R1, G1, B1)
S2
S3
(X, Y)
(R, G, B)
APEX 2 (X2, Y2)
(R2, G2, B2)
APEX 3 (X3, Y3)
(R3, G3, B3)
S1

FIG. 8

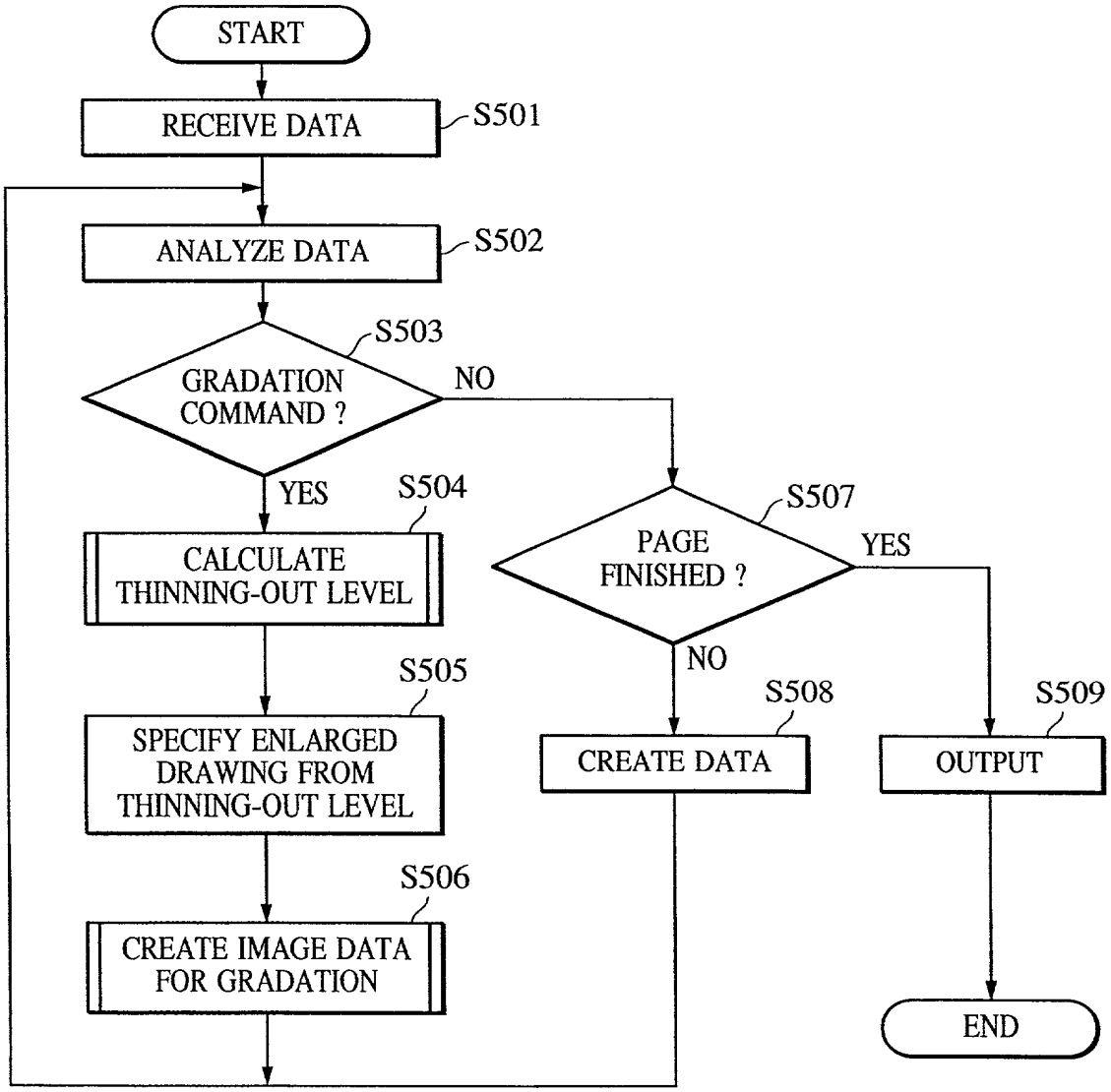

START
RECEIVE DATA
S501
ANALYZE DATA
S502
S503
GRADATION COMMAND ?
NO
YES
S504
CALCULATE THINNING-OUT LEVEL
S505
SPECIFY ENLARGED DRAWING FROM THINNING-OUT LEVEL
S506
CREATE IMAGE DATA FOR GRADATION
S507
PAGE FINISHED ?
YES
NO
S508
CREATE DATA
S509
OUTPUT
END

FIG. 9

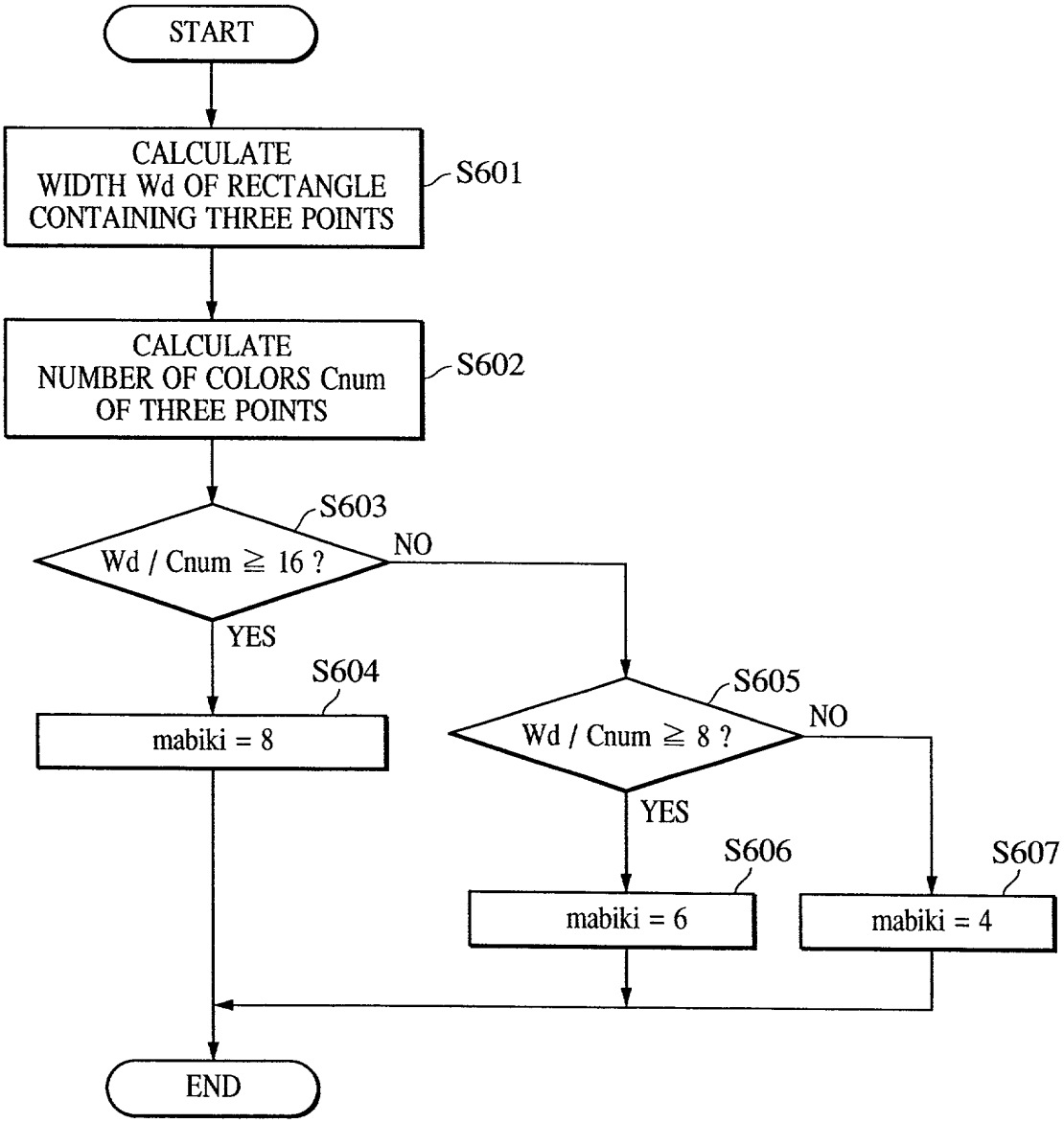

START
CALCULATE WIDTH Wd OF RECTANGLE CONTAINING THREE POINTS
S601
CALCULATE NUMBER OF COLORS Cnum OF THREE POINTS
S602
S603
Wd / Cnum ≧ 16 ?
NO
YES
S604
mabiki = 8
S605
Wd / Cnum ≧ 8 ?
NO
YES
S606
mabiki = 6
S607
mabiki = 4
END

FIG. 10

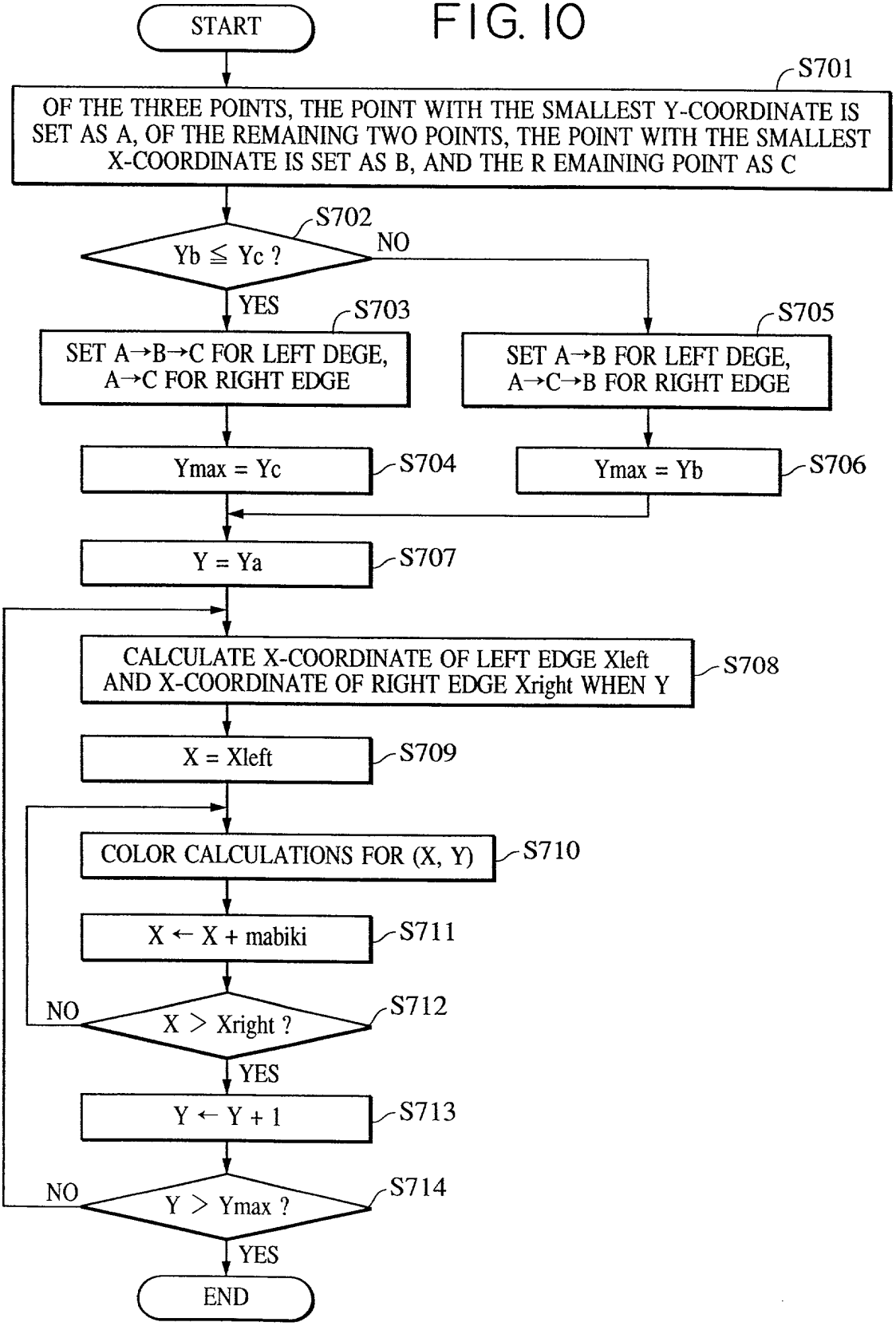

START
S701
OF THE THREE POINTS, THE POINT WITH THE SMALLEST Y-COORDINATE IS SET AS A, OF THE REMAINING TWO POINTS, THE POINT WITH THE SMALLEST X-COORDINATE IS SET AS B, AND THE R EMAINING POINT AS C
S702
Yb ≦ Yc ?
NO
YES
S703
SET A→B→C FOR LEFT DEGE, A→C FOR RIGHT EDGE
S705
SET A→B FOR LEFT DEGE, A→C→B FOR RIGHT EDGE
Ymax = Yc
S704
Ymax = Yb
S706
Y = Ya
S707
CALCULATE X-COORDINATE OF LEFT EDGE Xleft AND X-COORDINATE OF RIGHT EDGE Xright WHEN Y
S708
X = Xleft
S709
COLOR CALCULATIONS FOR (X, Y)
S710
X ← X + mabiki
S711
NO
X > Xright ?
S712
YES
Y ← Y + 1
S713
NO
Y > Ymax ?
S714
YES
END

FIG. 11

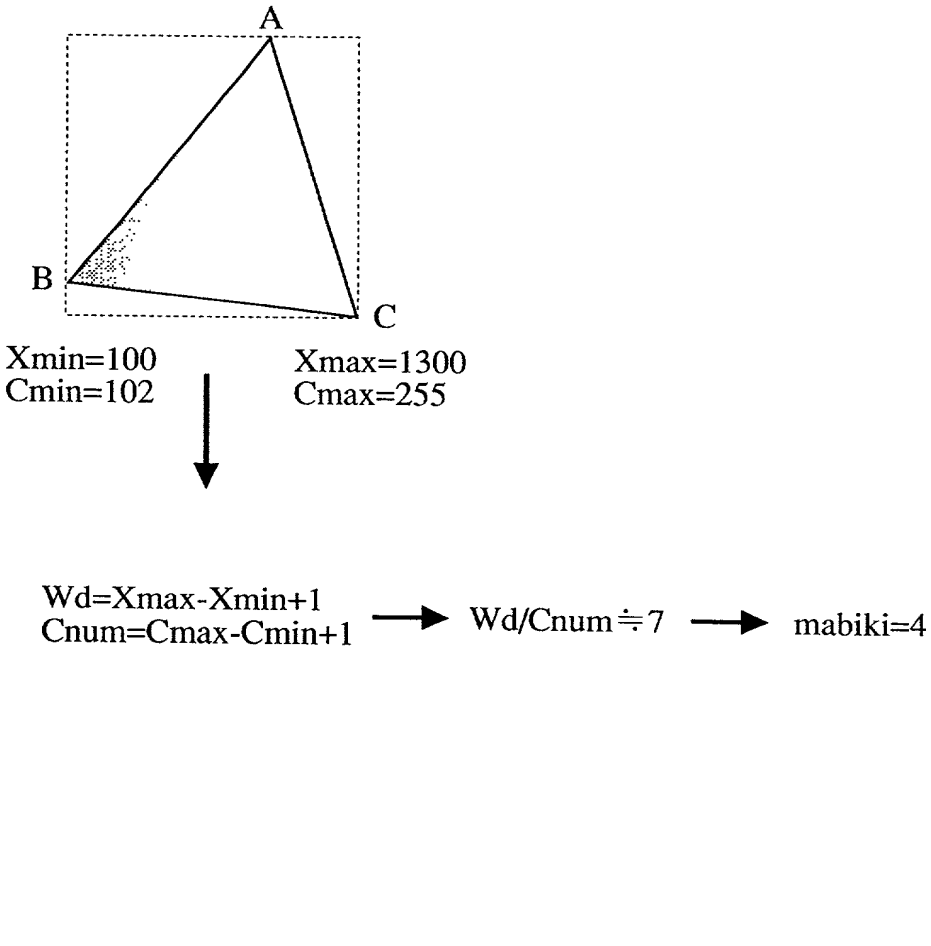

A
B
C
Xmin=100
Cmin=102
Xmax=1300
Cmax=255
Wd=Xmax-Xmin+1
Cnum=Cmax-Cmin+1
Wd/Cnum÷7
mabiki=4

FIG. 12

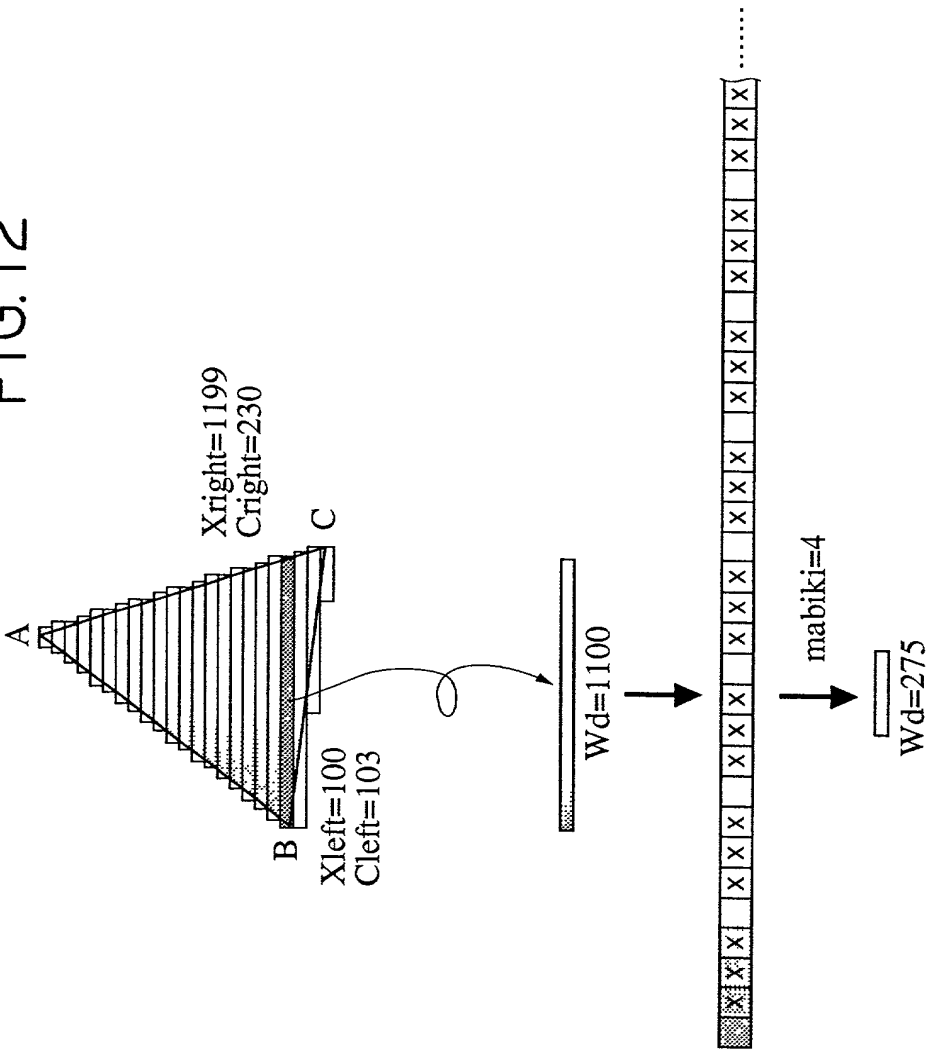

A
B
C
Xright=1199
Cright=230
Xleft=100
Cleft=103
Wd=1100
mabiki=4
Wd=275

FIG. 13

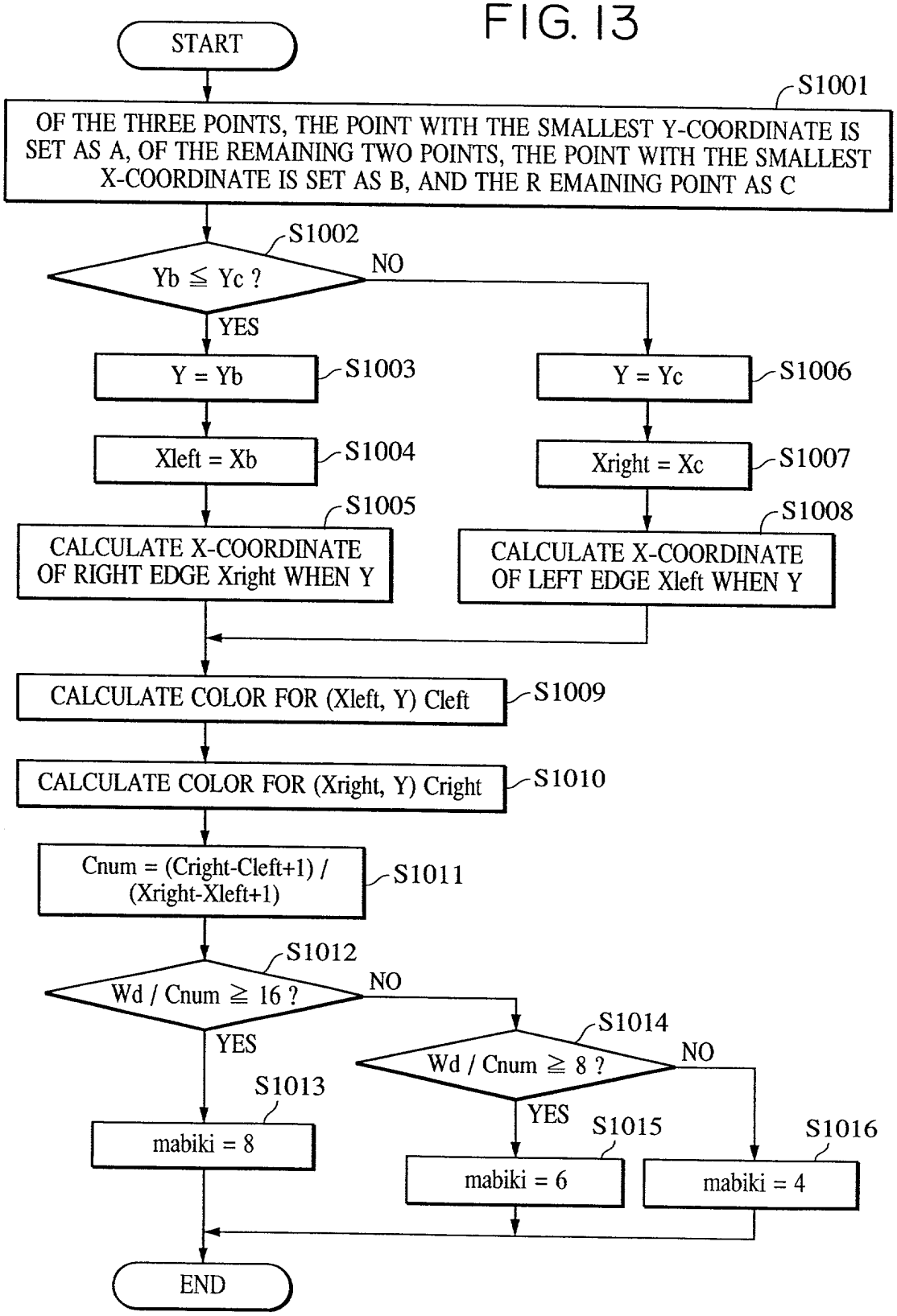
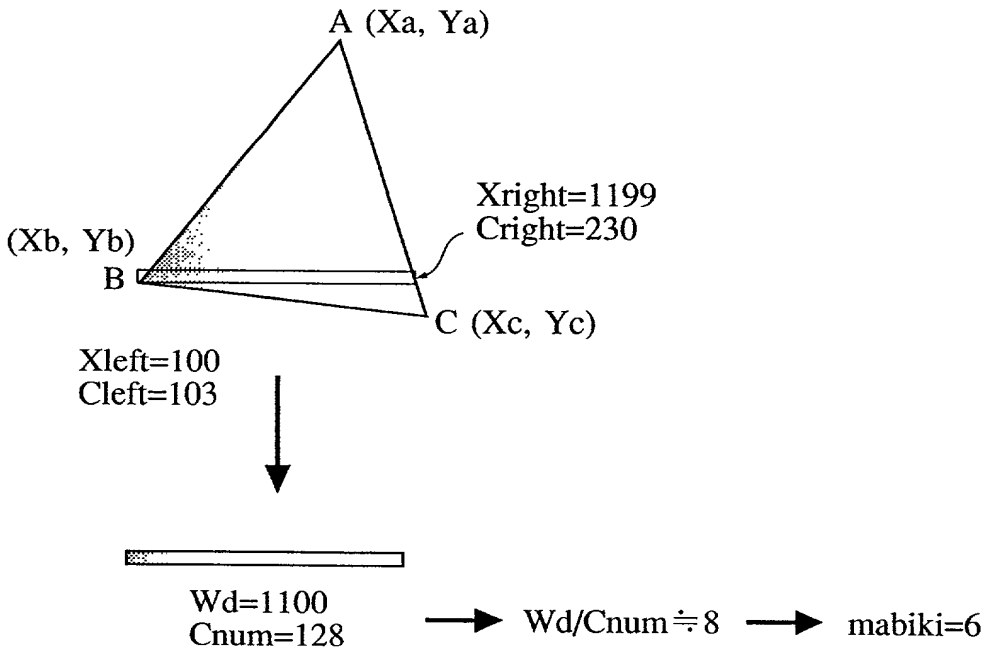

START
S1001
OF THE THREE POINTS, THE POINT WITH THE SMALLEST Y-COORDINATE IS SET AS A, OF THE REMAINING TWO POINTS, THE POINT WITH THE SMALLEST X-COORDINATE IS SET AS B, AND THE R EMAINING POINT AS C
S1002
Yb ≦ Yc ?
NO
YES
Y = Yb
S1003
Xleft = Xb
S1004
CALCULATE X-COORDINATE OF RIGHT EDGE Xright WHEN Y
S1005
Y = Yc
S1006
Xright = Xc
S1007
CALCULATE X-COORDINATE OF LEFT EDGE Xleft WHEN Y
S1008
CALCULATE COLOR FOR (Xleft, Y) Cleft
S1009
CALCULATE COLOR FOR (Xright, Y) Cright
S1010
Cnum = (Cright-Cleft+1) / (Xright-Xleft+1)
S1011
S1012
Wd / Cnum ≧ 16 ?
NO
YES
S1013
mabiki = 8
S1014
Wd / Cnum ≧ 8 ?
NO
YES
S1015
mabiki = 6
S1016
mabiki = 4
END

FIG. 14


A (Xa, Ya)
Xright=1199
Cright=230
(Xb, Yb)
B
C (Xc, Yc)
Xleft=100
Cleft=103
Wd=1100
Cnum=128
Wd/Cnum÷8
mabiki=6

TOKKYO-SHOSHO

FIG. 15

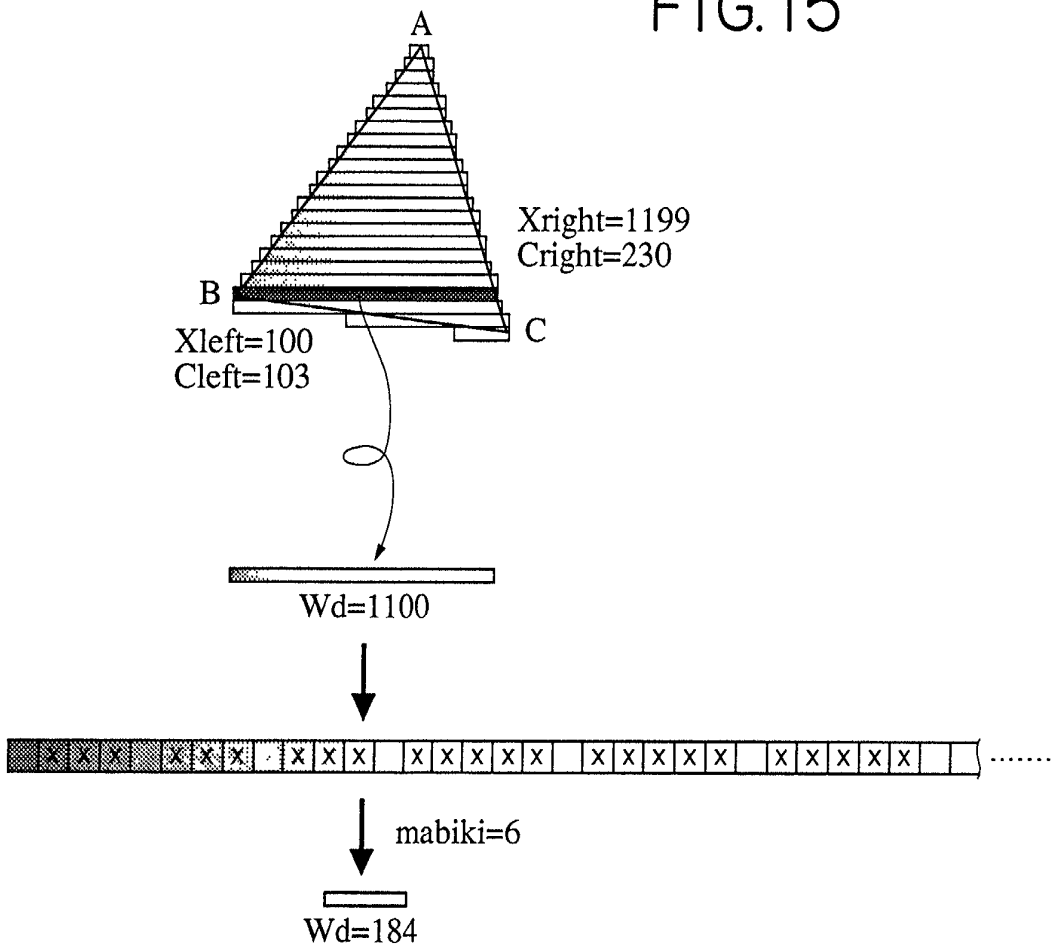


FIG. 16A

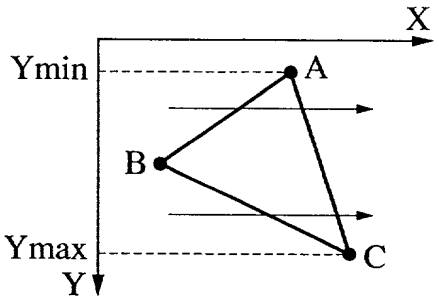


FIG. 16B

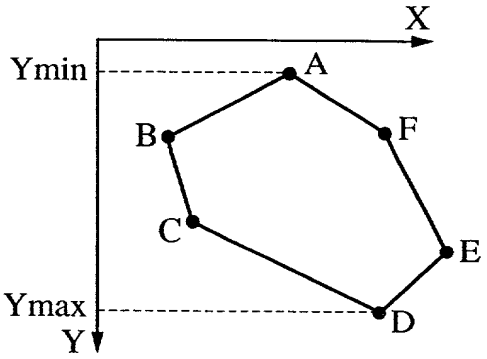


FIG. 16C

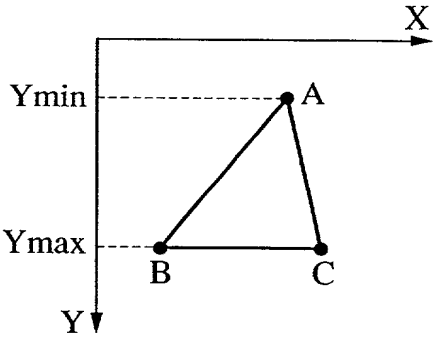
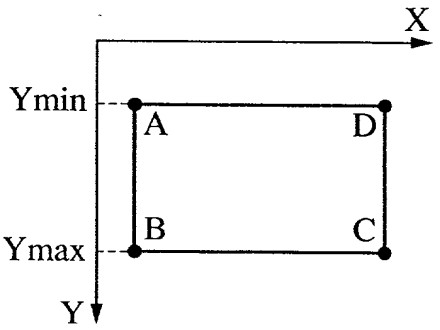



FIG. 16D